

WHAT IS CLAIMED IS:

1. A process for the synthesis of a polyisocyanate composition comprising acylureas, characterized in that  
5 a "starting" composition comprising derivatives comprising at least two isocyanate functional groups is subjected to the action of at least two acids, one at least of which is a strong acid ( $\text{pK}_a \leq 3$ ) and another at least of which is an acid of moderate strength  
10 ( $3 \leq \text{pK}_a \leq 6$ ), at a temperature at least equal to  $50^\circ\text{C}$ .
2. The process as claimed in claim 1, characterized in that at least one of the isocyanate derivatives is a monomer.  
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3. The process as claimed in claims 1 and 2, characterized in that the monomer derivatives represent at least  $1/3$ , advantageously  $1/2$ , by weight of said starting composition.  
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4. The process as claimed in claims 1 to 3, characterized in that the monomer derivative or the monomer derivatives represent at least 90%, advantageously 95%, by weight of said starting  
25 composition.
5. The process as claimed in claims 1 to 4, characterized in that the monomer derivative or in that at least one of the monomer derivatives is at least  
30 partially aliphatic, that is to say that at least one, advantageously two, preferably all, of the isocyanate functional groups of the diisocyanate unit is/are carried by a carbon of  $\text{sp}^3$  hybridization.
- 35 6. The process as claimed in claims 1 to 5, characterized in that said polyisocyanate composition comprises derivatives comprising a biuret functional group and in that said starting composition is additionally brought into contact with an amine or an

amine-generating reactant, advantageously water in the form of a fluid.

7. The process as claimed in claims 1 to 6,  
5 characterized in that said polyisocyanate composition comprises derivatives comprising a biuret functional group and in that said starting composition is additionally brought into contact with an amine or an amine-generating reactant, advantageously water in the  
10 form of a fluid, the molar ratio of the amine (generated or introduced) to the sum of the monomers, expressed in moles, being chosen within the closed range (that is to say, comprising the limits) extending from 1/2 to 1/50, advantageously within that extending  
15 from 1/3 to 1/25.

8. The process as claimed in claims 6 and 7, characterized in that said starting composition is brought into contact with water in the presence of said  
20 moderate and strong acid(s), advantageously added beforehand.

9. The process as claimed in claims 1 to 8, characterized in that the strong acid is chosen from  
25 aliphatic or aromatic sulfonic, phosphonic, including carboxylic-phosphonic, ester phosphoric or perhaloalkanoic acids.

10. The process as claimed in claims 1 to 9,  
30 characterized in that the moderate acids are chosen from aliphatic or aromatic carboxylic acids.

11. The process as claimed in claims 1 to 10, characterized in that the moderate acid(s) is (are) at  
35 least partially introduced into the reaction medium in the form of a precursor.

12. The process as claimed in claims 1 to 11, characterized in that the strong acid(s) is (are) at

least partially introduced into the reaction medium in the form of a precursor.

13. The process as claimed in claims 1 to 12,  
5 characterized in that at least one of the moderate acids differs from at least one strong acid by at least one pK unit, advantageously 2 pK units.

14. The process as claimed in claims 1 to 13,  
10 characterized in that the content of strong acid(s) is chosen so that the molar ratio of the sum of the strong acid functional groups, expressed as equivalents, to the sum of the monomers, expressed as moles, is at least equal to 0.1 ‰, advantageously to 0.5 ‰,  
15 preferably to 1 ‰.

15. The process as claimed in claims 1 to 14,  
characterized in that the content of strong acid(s) is chosen so that the molar ratio of the sum of the strong  
20 acid functional groups, expressed as equivalents, to the sum of the monomers, expressed as moles, is at most equal to 2%, advantageously to 1%.

16. The process as claimed in claims 1 to 15,  
25 characterized in that the content of moderate acid(s) is chosen so that the molar ratio of the sum of the moderate acid functional groups, expressed as equivalents, to the sum of the monomers, expressed as moles, is at least equal to 2 ‰, advantageously to  
30 5 ‰, preferably to 1%.

17. The process as claimed in claims 1 to 16,  
characterized in that the content of moderate acid(s) is chosen so that the molar ratio of the sum of the  
35 moderate acid functional groups, expressed as equivalents, to the sum of the monomers, expressed as moles, is at most equal to 10%, advantageously to 5%.

18. The process as claimed in claims 1 to 17,

characterized in that said strong acid is introduced in a dilute form, advantageously a form diluted with at most 50 times, preferably with 1 to 20 times, its weight of diluent.

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19. The process as claimed in claim 18, characterized in that said strong acid is diluted in water.

20. The process as claimed in claim 19, characterized in that said strong acid is diluted in a C<sub>1</sub> to C<sub>14</sub> alcohol, advantageously a C<sub>3</sub> to C<sub>10</sub> alcohol.

21. The process as claimed in claim 20, characterized in that said strong acid is diluted in said moderate acid.

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22. An isocyanate composition comprising at least 1% (by weight), advantageously at least 1.5%, preferably at least 2%, of acylureas of at most 5 diamino units.

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23. The composition as claimed in claim 22, characterized in that it comprises at least 1% of monoacylurea.

24. The composition as claimed in claims 22 and 23, characterized in that it comprises at least 2% of diacylurea corresponding to an at least bifunctional acid.

25. The composition as claimed in claims 20 to 24, characterized in that it comprises, by weight, at least 10%, advantageously 15%, preferably 25%, of true biuret.

26. The composition as claimed in claims 20 to 25, characterized in that it comprises, by weight, at most 4/5, advantageously 2/3, preferably at most 1/2, of true biuret.

27. The composition as claimed in claims 20 to 26, characterized in that the ratio by weight of the monoacylureas (numerator) to the oligomers of at least six diamino units is at least equal to 2%,  
5 advantageously to 5%, preferably to 7%.

28. The composition as claimed in claims 20 to 27, characterized in that the ratio by weight of the monoacylureas (numerator) to the oligomers of at least  
10 six diamino units is at most equal to 50%, advantageously to 40%, preferably to 20%.